Reprinted from "Journal of the Elisha Mitchell Scientific Society" Volume 116, 2000, pp. 260-261, Parker. Courtship in hogfish, Lachnolaimus maximus, and other behavior of reef fishes off Beaufort, North Carolina. With permission from Dr. Frank J. Schwartz (Editor).

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COURTSHIP IN HOGFISH, *LACHNOLAIMUS MAXIMUS,* AND OTHER BEHAVIOR OF REEF FISHES OFF BEAUFORT, NORTH CAROLINA

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Warmer bottom water temperatures along the subtidal continental shelf off Beaufort, North Carolina since 1977, have resulted in a dramatic increase in the tropical faunal composition (Parker and Dixon, 1998). Observations of fish behavior on the "210 Rock" during two study periods between 1975 and 1993 (Parker, 1990; Parker and Dixon, 1998) indicated that during the interim there has been an increase in tropical community interactions. This paper provides details on courtship behavior, evidence of territory establishment and young-of-year recruitment, and an apparent increase in fish cleaning activities alluded to by Parker and Dixon (1998). All observations were made during 20 min monthly diving surveys using SCUBA between 1030–1330 hr.

The "210 Rock" is 44 km south of Beaufort Inlet in depths of 27–33 m (34°14′N, 76°35′W). It consists of bioeroded limestone and carbonate sandstone outcroppings (Newton et al., 1971) with a maximum relief of about 4 m. Outcroppings are covered with algae, bryozoa, hydroids, sponges, soft corals, and diminutive hard corals.

Courtship in hogfish, *Lachnolaimus maximus,* was observed 7 May 1993. Two hogfish estimated 2.7–3.6 kg, one with a reddish-brown top of head and snout and reddish-yellow body, probably female, and the other with a reddish-brown top of head and snout and white body, probably male, were first seen side by side under a ledge 0.5 m high. The female remained stationary while the male was observed to flare his spiny dorsal fin and quiver beside the female, then dart out from under the ledge and rapidly approach the divers, baring his teeth and again flaring his dorsal fin. The male returned under the ledge and repeated the entire episode. I believe that May is near the peak spawning period for hogfish in coastal North Carolina based on Colin (1982) who reported peak spawning of hogfish off southwestern Puerto Rico from December to April in water temperatures of 24 to 27°C. Bottom water temperature at the time of our observations at the "210 Rock" was 18°C.

I observed a totally different behavioral pattern for three other species, which may be related to courtship, spawning, or territoriality, and which also suggested that these species have become established. A night sergeant, *Abudefduf taurus,* alternately advanced toward a diver with flared dorsal fin and returned to finning a small sandy area among rock outcroppings, 7 July 1991. A wrasse bass, *Liopropoma eukrines,* was seen darting, diving, twisting, and flaring in a similar area, 4 October 1991. Two white grunts, *Haemulon plumieri,* were seen in the open mouth-to-mouth position, 3 August 1990.

Very small (10–20 mm) young-of-year reef fishes were observed during the two study periods. At least 12 species were seen, and three species: tomtate, *Haemulon aurolineatum,* purple reeffish, *Chromis scotti,* and yellowtail reeffish, *Chromis enchrysurus,* were seen as young-of-year more than once (Table 7; Parker and Dixon, 1998).

Cleaning symbiosis involving wrasses (Labridae) and gobies (Gobiidae) was observed on seven occasions during the 1991–1993 study period and on three occasions previously (1975–1977) when water temperatures were above 20°C. During the recent period a Spanish hogfish, *Bodianus rufus,* cleaned a knobbed porgy, *Calamus nodosus,* on three occasions, and a tautog, *Tautoga onitis,* and a white grunt once each. Scamp, *Mycteroperca phenax,* were cleaned by juvenile bluehead, *Thalassoma bifasciatum,* in September 1991, and by gobies, *Gobiosoma* sp., while remaining motionless in a basket sponge in July 1992. A white grunt, *Haemulon plumieri,* was also cleaned by gobies in a sponge in July 1992. During the earlier study, gag, *Mycteroperca microlepis,* were cleaned by a Spanish hogfish and a goby, *Gobiosoma* sp., and a planehead filefish, *Monacanthus hispidus,* was cleaned by an unidentified goby.

These observations collectively, support the notion that tropical reef fishes are becoming better established off Beaufort, North Carolina. We postulate that these observations provide support to global warming suppositions of Parker and Dixon (1998).

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